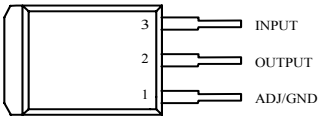
SP1084

5A Low Dropout Linear Regulator

TO-263-3



Features

- Low Dropout Voltage: 1.3V Typically at 5A
- Current Limiting and Thermal Protection
- Output Current: 5A
- Current Limit: 6.5A
- Operating Junction Temperature Range:0 to 125°C
- Line Regulation: 0.015% (Typical)
- Load Regulation: 0.2% (Typical)
- Available in RoHS Compliant, Lead Free Packaging

Applications

- High Efficiency Linear Regulators
- Battery Chargers
- Post Regulation for Switching Supply
- Microprocessor Supply
- Desktop PCs, RISC and Embedded Processors Supply

General Description

The SP1084 is a series of low dropout positive voltage regulators with a maximum dropout of 1.5V at 5A of load current.

The series features on-chip thermal limiting which provides protection against any combination of overload and ambient temperatures that would create excessive junction temperatures. It also includes a trimmed band-gap reference and a current limiting circuit.

The SP1084 is available in 1.5V, 1.8V, 2.5V, 2.85V, 3.3V and 5.0V versions. The fixed versions integrate the adjustment resistors. It is also available in an adjustable versio n which can set the output voltage with two external resis tors.

The SP1084 series is available in standard packages of TO-263-3, TO-220 and TO-252.

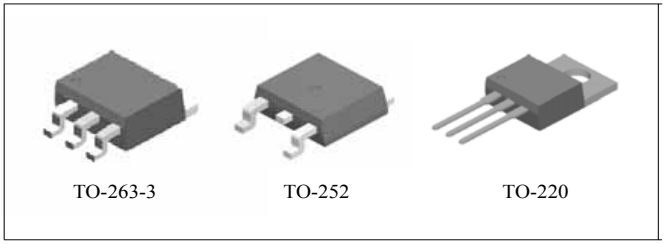
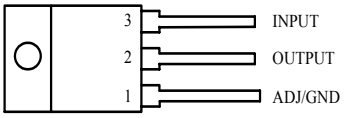


Figure 1. Package Types of SP1084

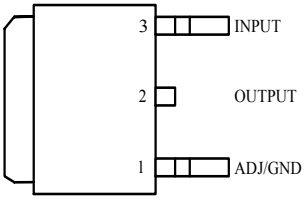
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Pin Configuration

V Package
(TO-220)



V2 Package
(TO-252)



V1 Package
(TO-263-3)

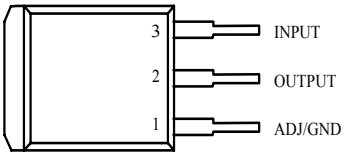


Figure 2. Pin Configuration of SP1084 (Top View)

Functional Block Diagram

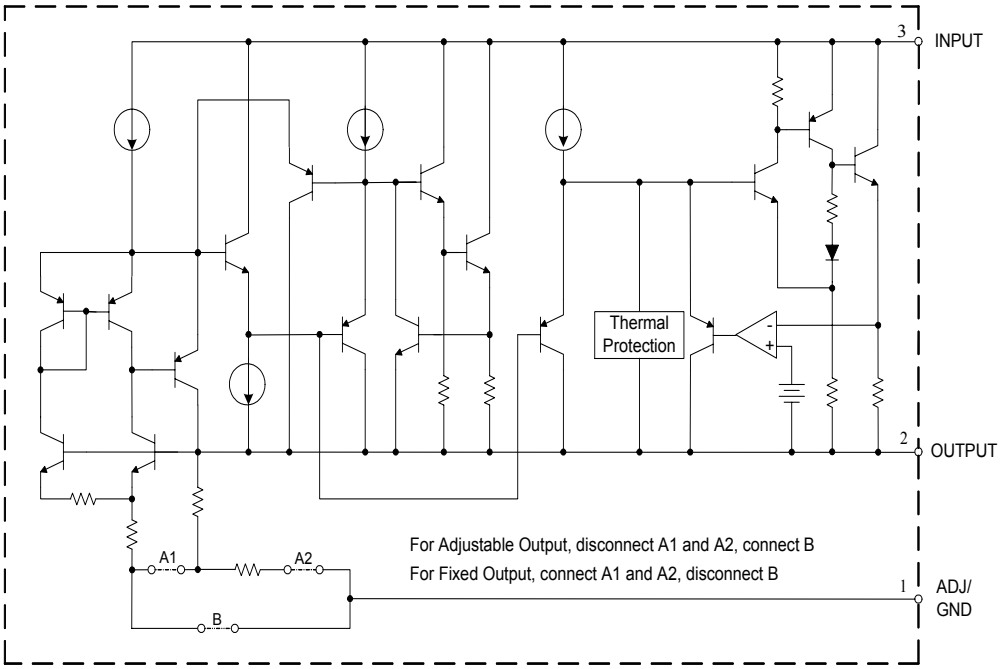


Figure 3. Functional Block Diagram of SP1084

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Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Min	Max	Unit
Operating Junction Temperature Range	T_J		150	^oC
Storage Temperature Range	T_S	-65	150	^oC
Lead Temperature (Soldering, 10 sec.)	T_{LEAD}		300	^oC
ESD (Human Body Model)	ESD		2000	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under"Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Input Voltage	V_{IN}		12	V
Operating Junction Temperature Range	T_J	0	125	^oC

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Electrical Characteristics

Typicals and limits appearing in normal type apply for $T_J = 25^oC$. Limits appearing in **Boldface** type apply over the entire operating junction temperature range.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{REF}	SP1084-ADJ, I_{OUT} = 10mA, V_{IN} -V_{OUT} = 3V, 10mA ≤ I_{OUT} ≤ 5A, 1.5V ≤ V_{IN} - V_{OUT} ≤ 5V	1.238 **1.225**	1.250 **1.250**	1.262 **1.270**	V
Output Voltage	V_{OUT}	SP1084-1.5, I_{OUT} = 0mA, V_{IN} = 4.5V, 10mA≤ I_{OUT} ≤ 5A, 3.1V≤ V_{IN} ≤ 6V	1.485 **1.47**	1.5 **1.5**	1.515 **1.53**	V
		SP1084-1.8, I_{OUT} = 0mA, V_{IN} = 4.8V, 10mA≤ I_{OUT} ≤ 5A, 3.4V≤ V_{IN} ≤ 6V	1.782 **1.764**	1.8 **1.8**	1.818 **1.836**	V
		SP1084-2.5, I_{OUT} = 0mA, V_{IN} = 5.5V, 10mA≤ I_{OUT} ≤ 5A, 4.1V≤ V_{IN} ≤ 7V	2.475 **2.45**	2.5 **2.5**	2.525 **2.55**	V
		SP1084-2.85, I_{OUT} = 0mA, V_{IN} = 6V, 10mA≤ I_{OUT} ≤ 5A, 4.5V≤ V_{IN} ≤ 8V	2.822 **2.793**	2.85 **2.85**	2.879 **2.907**	V
		SP1084-3.3, I_{OUT} = 0mA, V_{IN} = 6.3V, 10mA≤ I_{OUT} ≤ 5A, 4.9V≤ V_{IN} ≤ 8V	3.267 **3.234**	3.3 **3.3**	3.333 **3.366**	V
		SP1084-5.0, I_{OUT} = 0mA, V_{IN} = 8V, 10mA≤ I_{OUT} ≤ 5A, 6.6V≤ V_{IN} ≤ 10V	4.95 **4.9**	5 **5**	5.05 **5.1**	V
Line Regulation	ΔV_{OUT}	SP1084-ADJ, I_{OUT} = 10mA, 2.85V ≤ V_{IN} ≤ 10V		0.015 **0.035**	0.2 **0.2**	%
		SP1084-1.5, I_{OUT} = 10mA, 3.1V ≤ V_{IN} ≤ 10V		0.5 **1**	6 **6**	mV
		SP1084-1.8, I_{OUT} = 10mA, 3.4V ≤ V_{IN} ≤ 10V		0.5 **1**	6 **6**	mV
		SP1084-2.5, I_{OUT} = 10mA, 4.1V ≤ V_{IN} ≤ 10V		0.5 **1**	6 **6**	mV
		SP1084-2.85, I_{OUT} = 10mA, 4.5V ≤ V_{IN} ≤ 10V		0.5 **1**	6 **6**	mV
		SP1084-3.3, I_{OUT} = 10mA, 4.9V ≤ V_{IN} ≤ 10V		0.5 **1**	6 **6**	mV
		SP1084-5.0, I_{OUT} = 10mA, 6.6V ≤ V_{IN} ≤ 10V		0.5 **1**	10 **10**	mV

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Electrical Characteristics (Continued)

Typicals and limits appearing in normal type apply for $T_J = 25^oC$. Limits appearing in **Boldface** type apply over the entire operating junction temperature range.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Load Regulation	ΔV_{OUT}	SP1084-ADJ, 0mA≤ I_{OUT} ≤ 5A, V_{IN} - V_{OUT} = 3V		0.1 **0.2**	0.3 **0.4**	%
		SP1084-1.5, 0mA≤ I_{OUT} ≤ 5A, V_{IN} - V_{OUT} = 3V		3 **7**	15 **20**	mV
		SP1084-1.8, 0mA≤ I_{OUT} ≤ 5A, V_{IN} - V_{OUT} = 3V		3 **7**	15 **20**	mV
		SP1084-2.5, 0mA≤ I_{OUT} ≤ 5A, V_{IN} - V_{OUT} = 3V		3 **7**	15 **20**	mV
		SP1084-2.85, 0mA≤ I_{OUT} ≤ 5A, V_{IN} - V_{OUT} = 3V		3 **7**	15 **20**	mV
		SP1084-3.3, 0mA≤ I_{OUT} ≤ 5A, V_{IN} - V_{OUT} = 3V		3 **7**	15 **20**	mV
		SP1084-5.0, 0mA≤ I_{OUT} ≤ 5A, V_{IN} - V_{OUT} = 3V		5 **10**	20 **35**	mV
Dropout Voltage		I_O = 5A, ΔV_{REF},ΔV_{OUT}= 1%		1.3	1.5	V
Current Limit	I_{LIMIT}	V_{IN} - V_{OUT} = 3V,	5.5	6.5		A
Minimum Load Current		V_{IN} = 10V (SP1084-ADJ)		**3**	**10**	mA
Quiescent Current		V_{IN} = 10V (SP1084)		**5**	**10**	mA
Ripple Rejection		f_{RIPPLE} = 120Hz, C_{OUT} = 25µF Tantalum, I_{OUT} = 5A, V_{IN} - V_{OUT} = 3V	**60**	**72**		dB
Adjust Pin Current		V_{IN} = 4.25V, I_{OUT} = 10mA		55	**120**	µA
Adjust Pin Current Change		10mA ≤ I_{OUT} ≤ 5A, 1.5V≤ (V_{IN} -V_{OUT}) ≤ 4.5V		**0.2**	**5**	µA
Temperature Stability		I_{OUT} = 10mA, V_{IN} - V_{OUT} = 1.5		**0.5**		%
Long Term Stability		T_A = 125°C, 1000Hrs		0.5		%
RMS Noise (% of V_{OUT})		10Hz ≤ f ≤ 10kHz		0.003		%
Thermal Resistance Junction -to-Case	θ_{JC}	TO-263 TO-220 TO-252		3 3 4		°C/W

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Typical Performance Characteristics

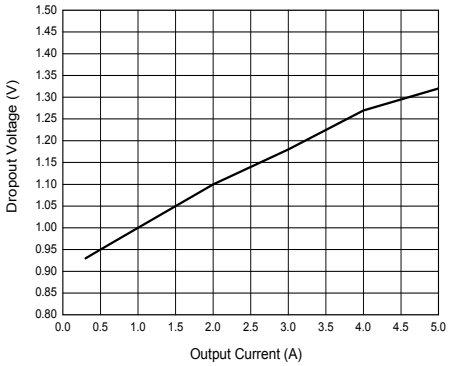


Figure 4. Dropout Voltage vs. Output Current

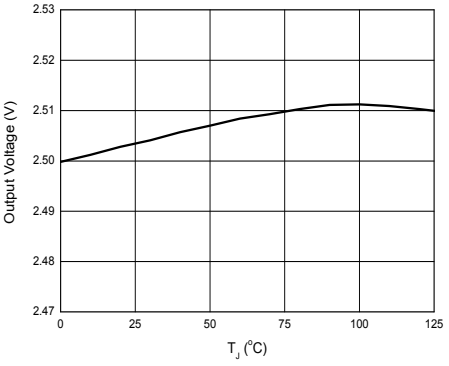


Figure 5. Output Voltage vs. Temperature

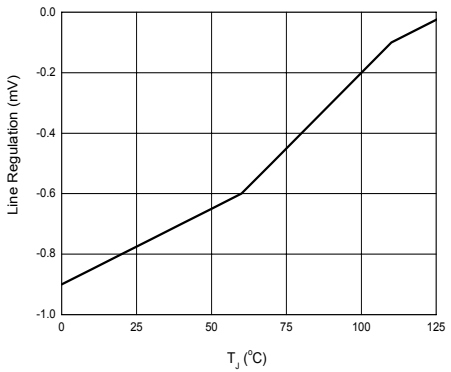


Figure 6. Line Regulation vs. Temperature

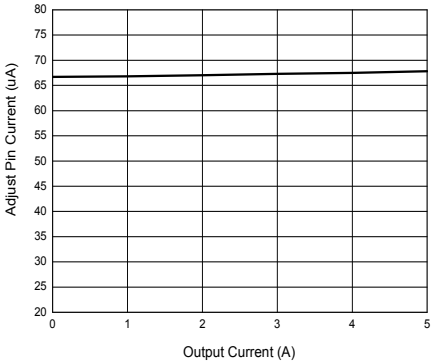


Figure 7. Adjust Pin Current vs. Output Current

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Typical Performance Characteristics (Continued)

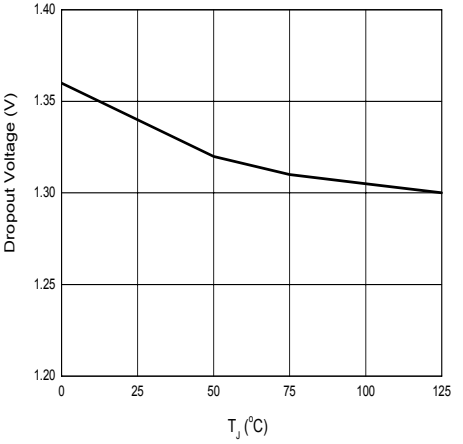


Figure 8. Dropout Voltage vs. Temperature

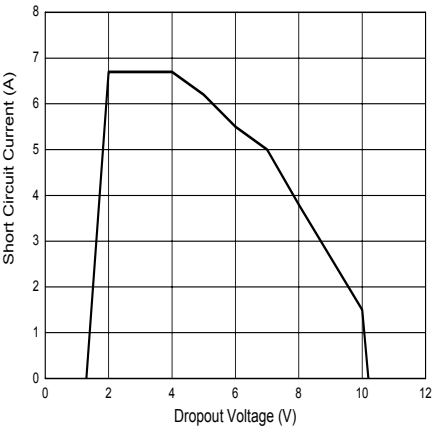


Figure 9. Short Circuit Current vs. Dropout Voltage

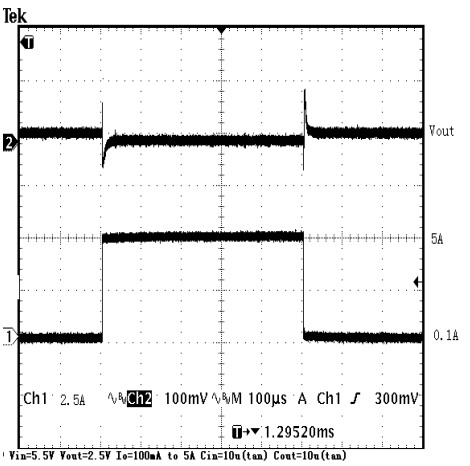


Figure 10. Load Transient Response

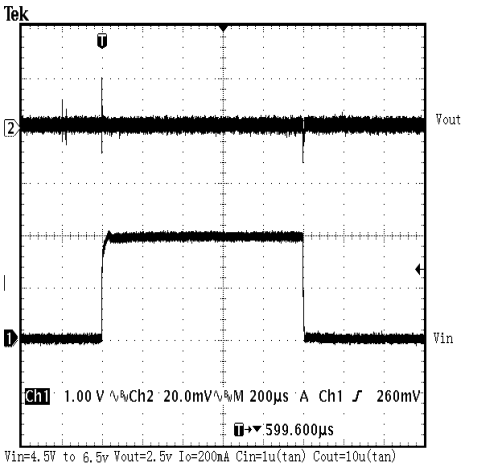


Figure 11. Line Transient Response

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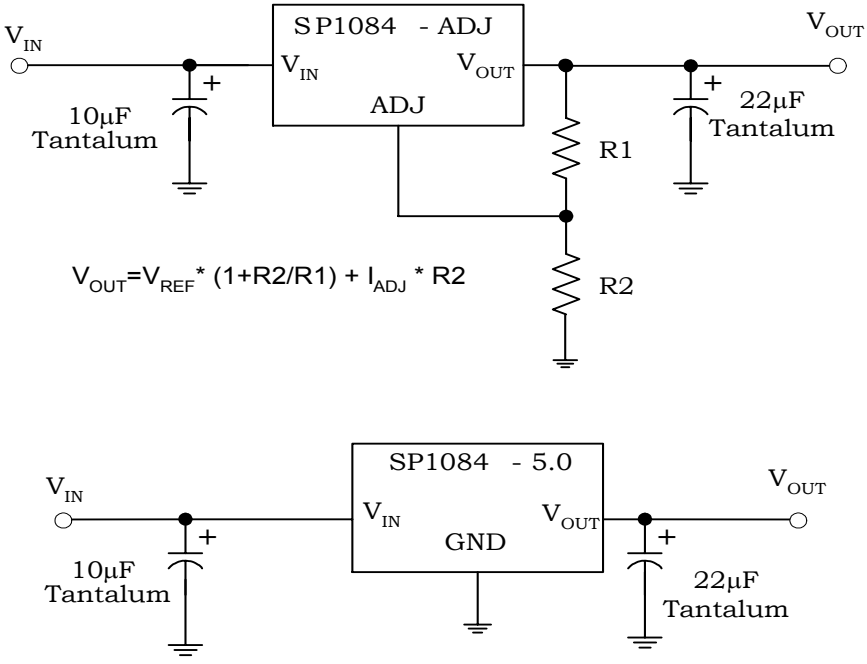
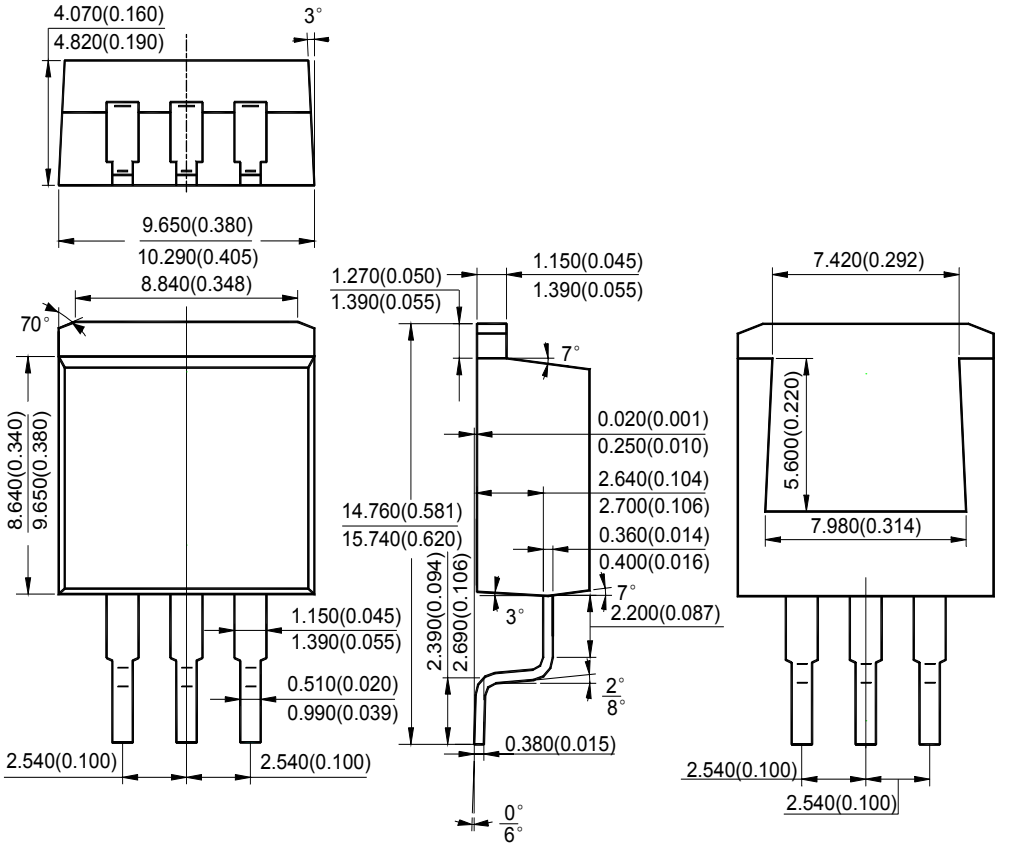


Figure 12. Typical Applications of SP1084

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Mechanical Dimensions

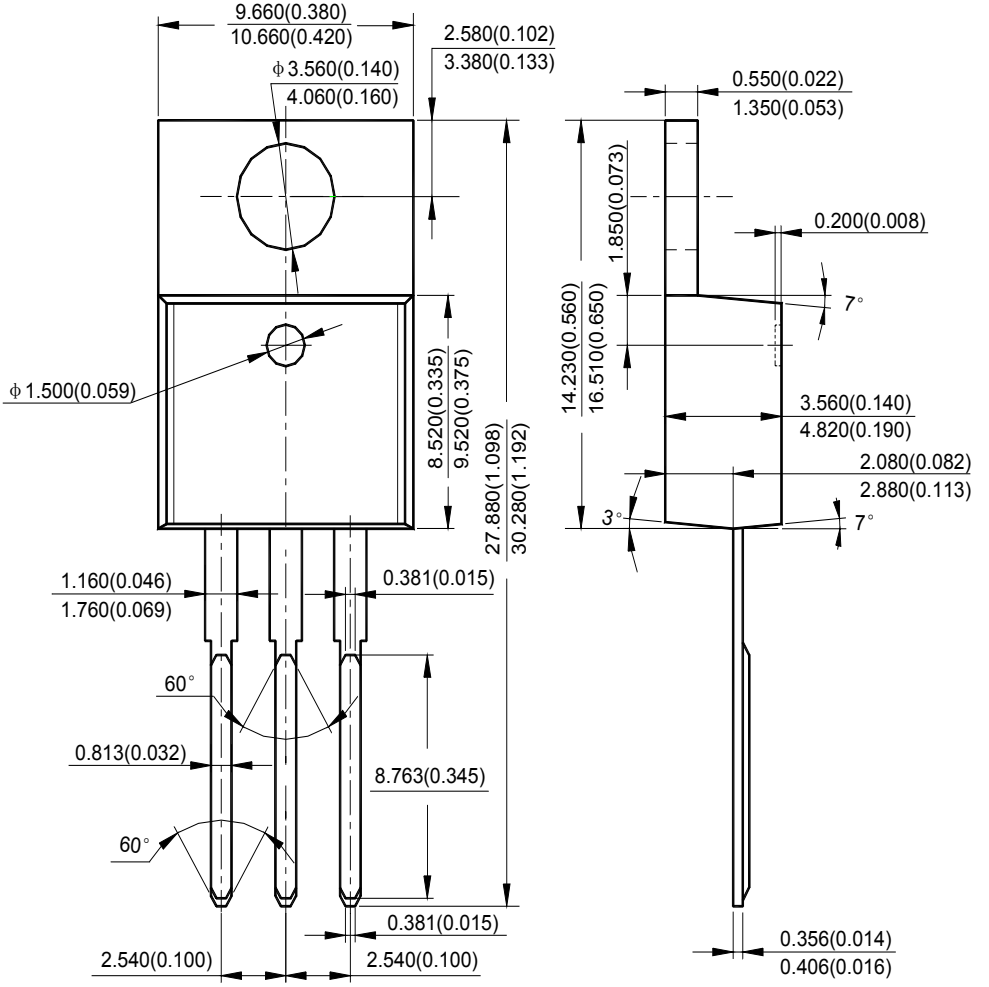
TO-263-3 **Unit: mm(inch)**



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Mechanical Dimensions (Continued)

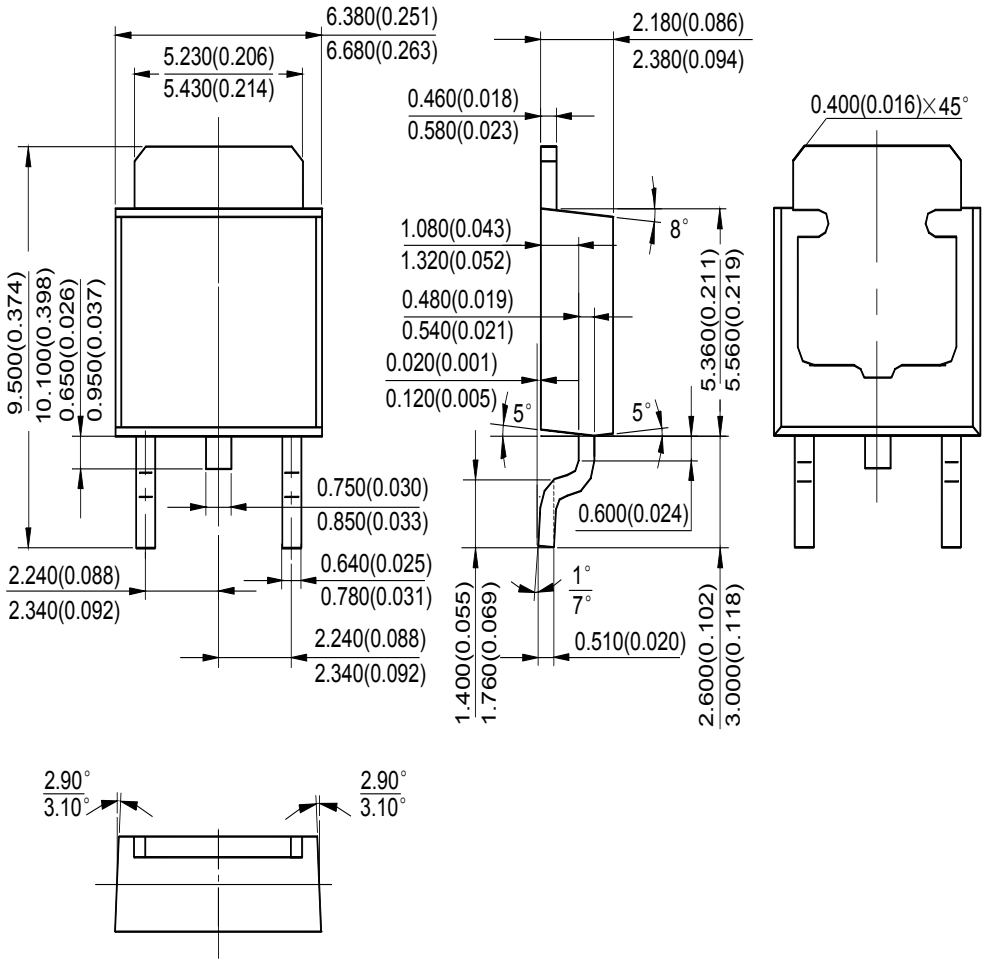
TO-220 **Unit: mm(inch)**



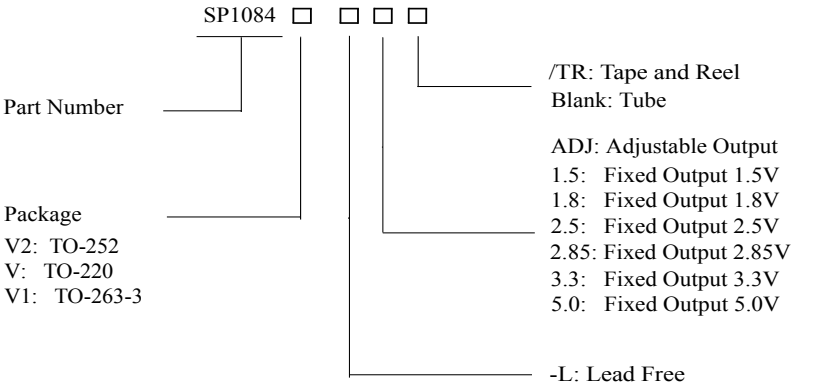
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Mechanical Dimensions (Continued)

TO-252 **Unit: mm(inch)**



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Part Number	Voltage Range	Temperature Range	Package	Pin Count	Pack Qty
SP1084V2-L/TR	Adj	0ºC to +125ºC	TO-252	2	2,500/TR
SP1084V2-L-1-5/TR	1.5V	0ºC to +125ºC	TO-252	2	2,500/TR
SP1084V2-L-1-8/TR	1.8V	0ºC to +125ºC	TO-252	2	2,500/TR
SP1084V2-L-2-5/TR	2.5V	0ºC to +125ºC	TO-252	2	2,500/TR
SP1084V2-L-2-85/TR	2.85V	0ºC to +125ºC	TO-252	2	2,500/TR
SP1084V2-L-3-3/TR	3.3V	0ºC to +125ºC	TO-252	2	2,500/TR
SP1084V2-L-5-0/TR	5V	0ºC to +125ºC	TO-252	2	2,500/TR
SP1084V1-L/TR	Adj	0ºC to +125ºC	TO-263	3	800/TR
SP1084V1-L-1-5/TR	1.5V	0ºC to +125ºC	TO-263	3	800/TR
SP1084V1-L-1-8/TR	1.8V	0ºC to +125ºC	TO-263	3	800/TR
SP1084V1-L-2-5T/R	2.5V	0ºC to +125ºC	TO-263	3	800/TR
SP1084V1-L-2-85/TR	2.85V	0ºC to +125ºC	TO-263	3	800/TR
SP1084V1-L-3-3/TR	3.3V	0ºC to +125ºC	TO-263	3	800/TR
SP1084V1-L-5-0T/R	5V	0ºC to +125ºC	TO-263	3	800/TR
SP1084V-L	Adj	0ºC to +125ºC	TO-220	3	50/TUBE
SP1084V-L-1-5	1.5V	0ºC to +125ºC	TO-220	3	50/TUBE
SP1084V-L-1-8	1.8V	0ºC to +125ºC	TO-220	3	50/TUBE
SP1084V-L-2-5	2.5V	0ºC to +125ºC	TO-220	3	50/TUBE
SP1084V-L-2-85	2.85V	0ºC to +125ºC	TO-220	3	50/TUBE
SP1084V-L-3-3	3.3V	0ºC to +125ºC	TO-220	3	50/TUBE
SP1084V-L-5-0	5V	0ºC to +125ºC	TO-220	3	50/TUBE

Solved by Sipex

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